

and future risk. It is obvious that the manifestation and attribution of a certain climate change effect carries a strong message concerning future risk. However, the fact that an impact has not occurred, or has not been documented, offers no indication for the absence of such a risk.

At the same time, although climate change may act synergistically with other risk factors, and will continue to gain importance as the rate and scale of climate change increases, it must be recognized that the most important driver of current risk for human systems related to environmental degradation is not necessarily (global) climate change, but also other issues such as land-use change, air pollution and poverty.

Unambiguous message

The map originally provided by WGII (Fig. 1) informed about the status of knowledge on observed and attributed effects of climate change with some regional specificity. In one sense, empty spaces and missing icons provide information about the current gaps in that knowledge. However, many factors could contribute to these gaps, including the

possible lack of data, a shortage of scientific studies, or the actual absence of any impacts of climate change.

Both representations are valid ways to convey a large amount of complex information in a scientifically consistent way. However, what the scientific community perceives as useful extra information could be confusing or misleading to another group of stakeholders. The revised version of the map (Fig. 2), while losing some of the spatially explicit information, addresses important sources of concern and highlights the main messages of the assessment: The fact that impacts of climate change occur worldwide, and the urgency of addressing climate change. □

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COMMENTARY:

Adaptive development

Arun Agrawal and Maria Carmen Lemos

Adaptive development mitigates climate change risks without negatively influencing the well-being of human subjects and ecosystems by using incentives, institutions, and information-based policy interventions to address different components of climate risks.

With the emergence of adaptation as a key focus for those interested in effective responses to the impacts of climate change, it is increasingly important to better understand the relationship between adaptation and development. Many decision-makers in developing and developed countries distinguish between the two because they view support for adaptation as additional to existing development aid. This distinction is also viewed as important to prevent the diversion of adaptation-related funds towards conventional development objectives and programmes. But for many, a firm division artificially separates policy goals that should be integrated for

more efficient outcomes, for example, by mainstreaming climate concerns into overall development goals^{1–3}.

Intuitively, it is easy to accept that development and adaptation are not equivalent even if a well-articulated and theoretically informed relationship has been difficult to pinpoint: both adaptation and development are fraught and contested concepts. But difficulties in distinguishing adaptation from development hinder empirical research on the subject and are an obstacle to policy innovations. We suggest that adaptation and development in the context of climate change can be separated by a focus on risks and risk management, and that this difference is paramount because

climate change risks are redefining what development policies can accomplish. Such a focus can also help in devising more concrete and targeted strategies to reduce adaptation deficits, defined as the gap between the need for adaptation versus current and anticipated future adaptation actions⁴.

Over the past century, development approaches have been linked to specific policy orientations: solving poverty through economic growth; addressing inequality through redistribution; and more recently, preventing environmental degradation through sustainable resource use⁵. These development approaches do not focus on risk management as a central policy goal, even if their implementation sometimes

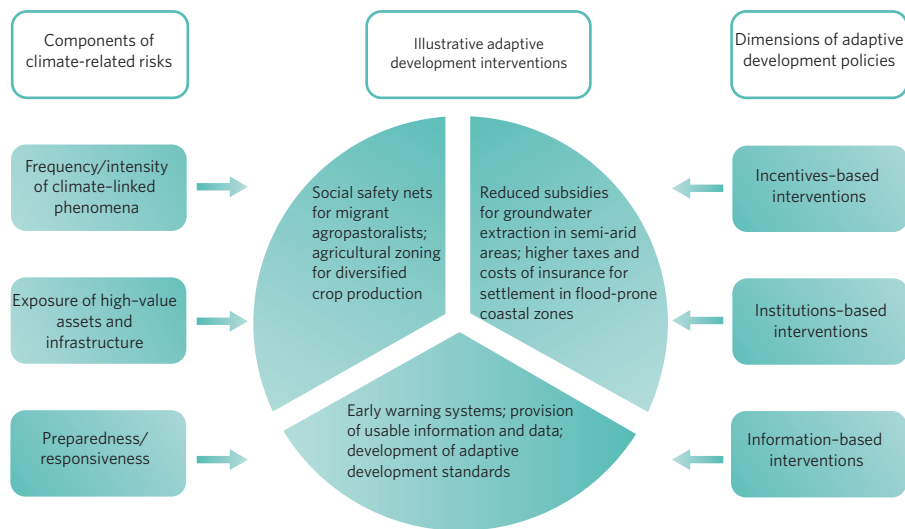


Figure 1 | Climate risks and adaptive development responses. The figure illustrates how the institutional, incentive-based, and information dimensions of policy responses to climate risks come together in concrete adaptive development interventions. In practice, adaptive development interventions combine some aspects of each of the three dimensions.

addresses risks. We propose ‘adaptive development’ as a form of development that mitigates risks without negatively influencing the well-being of human subjects and ecosystems.

Refocusing adaptation and development

Adaptive development thus aims to refocus both adaptation (by highlighting the importance of growth, equity, and sustainability) and development (by emphasizing risk mitigation). Such a refocusing is necessary because of the increasing range and variability of future climate phenomena, changes in the likelihood of extreme events, more subtle climate shifts, increasing exposure of valuable assets, and the resultant stresses on human, social, and ecological systems. As conceptualized here, adaptive development goes beyond the notion of mainstreaming climate concerns into development policy portfolios through technocratic instruments such as benefit–cost analysis or impact assessments^{6,7}. It also goes beyond promoting adaptation as a stand-alone policy field equipped with its own institutional apparatus and budget^{8,9}. Rather, adaptive development aims to integrate the political economy of risks in calculations of social welfare to determine how much and what kind of risks are societally acceptable across the range of climate-driven impacts. Such assessments require an elaboration of types of risks, their components, and importance⁶, possible strategies to address them including robust strategies that apply

across a range of future climate scenarios¹⁰, and deliberative discussions over issues of trust, liability, consent, and conflict that cannot be addressed through a ‘calculative rationality’ for risks¹¹. The last of these — broad, deliberative discussions regarding appropriate social responses to climate change — has been missing in current policy debates, but are particularly important in view of some of the deep uncertainties associated with future climate change¹².

Adaptive development answers a fundamental question in the context of climate change: how must development strategies under climate change differ from earlier attempts to develop? Two standard responses to this question are inadequate. One answer — that development as pursued until now will also address climate change problems — is inadequate because development in the business-as-usual manner will ill-equip peoples, societies, and governments to address unprecedented future risks and disasters. Indeed, recent major disasters, whether floods, tsunamis, droughts, or slower shifts related to agricultural commodity prices and financial markets, provide ample evidence that national governments, multilateral and international aid organizations, and communities are not prepared for sudden, large-scale shocks nor longer-term subtle changes.

In contrast, the second answer attributes climate change itself to development as historically pursued. Posited in sustainable and post-development writings, solutions to climate change can be shifts towards

‘appropriate development’, or development without a focus on growth¹³. But this answer is also inadequate, whether less development is defined through the familiar emphasis on reducing consumption or as a resort to more traditional modes of life. It essentially ignores the misery of poverty that is the reality for billions of people. It offers instead a post-development vision that seems both implausible and sadly ironic, given that the poorest are yet to enjoy the fruits of development.

More generally, both answers need to address the fundamental challenge of climate change for more vulnerable groups more carefully: higher climate risks will unequally expose many hundreds of millions of households to increasingly volatile earnings and livelihoods, periodically render large numbers of households destitute, and require more robust social and policy mechanisms to address sudden-as well as slow-onset fluctuations in the environment^{7,14}.

Many scholars have already pointed to the existence of substantial adaptation deficits in current responses to climate change^{4,15}. Adaptive development lends these perspectives both greater sharpness and a framework for combining development and adaptation. It does so by highlighting the need for development policy to address existing and anticipated deficits by accounting for risks directly and insistently in climate change responses.

Accounting for risks

Adaptive development is different from earlier development paradigms because development strategies must now explicitly take into account climate change-related risks and address persistent adaptation deficits, in addition to their focus on poverty, inequality, and resource scarcity. Research analysing sources of climate risks is a useful point of departure: it highlights both worrying disjunctures/fractures in scholarly analyses of risks, and indicates how development policy choices can mitigate risks and reduce adaptation deficits faced by households, societies, and governments. It clearly suggests that in addition to the changing probability and/or potentially greater frequency and intensity of negative weather and climate events, risks are a function of the values of assets exposed to such events and the ability of households and social groups to prepare against and respond to them^{16,17}.

But, unfortunately, many existing development policies fail to account for risks, and indeed worsen them. Consider three examples, corresponding to the three components of risks mentioned above:

i) greater likelihood of rapid-and slow-onset disasters; ii) exposure of high-value assets; and iii) gaps in social preparedness and responsiveness. Agricultural policies promoting cultivation of single cultivars and large areas of crop monocultures underestimate the expanding range of agricultural pathogens, increasing the potential for the decimation of large areas of food and commodity crops. Large-scale urban development in coastal zones and water extraction in semi-arid areas increases the exposure of high-value assets. Sedentarization of pastoralist livelihoods ignores the adaptive contributions of seasonal migration in semi-arid regions, forcing migrant agropastoralists to suffer the vagaries of erratic rainfall. Disturbing as they are, these three examples are only illustrations of the pervasive tendency in contemporary development policies to treat climate-linked risks as essentially unchanging compared with the past, thereby contributing to increases rather than reductions in adaptation deficits. In contrast, adaptive development policies would at a minimum seek to reduce the value of assets exposed to climatic and other risks and support the preparedness and responsive capacities of citizens and communities.

New approaches to help govern social and individual risks also need to explicitly consider the negative synergy between poverty and vulnerability. Breaking this vicious cycle requires empirical research on climate impacts to move beyond vulnerability assessment and adaptation strategies. Instead, such research must urgently address questions such as: How can policies promoting growth also take the multiple components of risks into account? How can the unequal burden of underdevelopment be mitigated and redistributed to reduce the riskiness of livelihood choices? And how can interventions to promote sustainability reduce the risks of climate change impacts? Implementation of answers to the above questions is unlikely to be successful the very first time, and will require experimentation, monitoring, and learning to understand the links between traditional development policies and those designed to address climate-related risks.

The focus on risks and how they can be reduced while pursuing development makes it possible to identify the essential difference between development in the face of climate change and development as growth, development as equity, and development as sustainability. For example, in drought-ravaged northeast Brazil, while conditional cash transfers through the Family Allowance Program increased the incomes of the

poor and are fundamentally changing their livelihoods. But they are also falling short of enabling the more exposed households dependent on rain-fed agriculture to manage drought risks¹⁷. In Ethiopia, shocks to agricultural productivity have also been found to adversely affect the incomes of non-farming enterprises¹⁸.

The concept of adaptive development, when considered as a means to address risks faced by diverse populations, provides a robust conceptual foundation on which to elaborate strategies to improve the life chances of the poor, improve the long-term sustainability of ecosystems, and reduce the risks related to pervasive adaptation deficits. The idea of adaptive development draws attention to the dynamic, non-linear, and often surprising nature of climate change hazards. Thinking about development through a risk and risk-governance lens enables policymakers and scholars to draw upon a vast body of historical and emerging scholarly work that has examined the nature of risks, how risks can be (and have been) addressed, and how they affect the long-term welfare of the poor^{19–21}.

Market-based risk mitigation strategies such as insurance products of different kinds and diversification into different types of assets already address some risks. But more comprehensive risk management requires a broader portfolio of strategies to reconfigure economic activity, social organization, household-level responses, and cultural practices in ways that counter the increasing riskiness of human existence^{22,23}. Social research on soft policy options to influence social behaviour and outcomes highlight the importance of three linked strategic dimensions for structuring policy interventions: incentives, institutions, and information^{24,25}. Figure 1 presents an illustrative schematic that connects specific components of climate and social risks to potential adaptive development interventions, building on institutions, incentives and information dimensions.

This Commentary presents a theoretical basis to distinguish adaptation from development and a conceptual basis to explore adaptive development policy options. In so doing, it also specifies how adaptation deficits faced by households, communities, and governments can be addressed by devising strategic responses to the three components of climate risks detailed above. The translation of our argument into concrete risk-management efforts that do not undermine human well-being is a critical next step. We also note that a focus on sources of risks is, by itself, inadequate to address the deep uncertainties associated with future climate change. But

it is at least likely to render decision-making more attuned to such uncertainties, facilitate adaptive development strategies that are robust to a range of future climate and social scenarios, and enable societally broad-based discussions that elaborate upon future courses of action deliberatively and democratically.

In the context of responses to recent climate change, being aware of the distinctions and connections between adaptation and development has profound implications for decisions, policy, and funding of adaptation and development. Indeed, we advance the claim that it is one of the most important issues in scholarly and policy discourses around adaptation and climate change.

Our Commentary thus makes two important contributions — one conceptual, the other translational — to rethink development in the context of heightened risks from climate change, and prepare the ground for an elaboration of more specific strategies through which dimensions of policy interventions can be combined in concrete implementation efforts to address multiple risk components. □

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